

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1-15. (Canceled)

16. (Currently Amended) A process for controlled radical polymerization using an organosulfur reversible chain transfer agent which consists in preparing polymers having a molar weight of greater than 100 000 g/mol, with a polydispersity index of less than 1.2 for molar weights of less than 200 000 g/mol and of less than 1.4 for molar weights of greater than 200 000 g/mol, with a degree of conversion of monomer of greater than 75% and a polymerization time of less than 8 h, ~~characterized by the control of said process comprising controlling the flux of initiator radicals in the polymerization medium.~~

17. (Currently Amended) The polymerization process as claimed in claim 16, ~~characterized in that wherein~~ the control of the flux of initiator radicals is achieved by the stages consisting in:

- i) maintaining a uniform polymerization temperature T_1 during the initiation period, and
- ii) continuing the polymerization, the polymerization temperature being allowed to fall to the temperature T_2 ,

it being understood that T_1 and T_2 correspond to the following equations (1) and (2):

$$T_1 > T_2 \quad (1) \text{ and}$$

$$T_1 - T_2 \leq 50^\circ\text{C} \quad (2).$$

18. (Currently Amended) The polymerization process as claimed in claim 17, ~~characterized in that wherein~~ T_1 is between 60 and 95°C, ~~more preferably between 80 and 90°C.~~

19. (Currently Amended) The polymerization process as claimed in claim 17, ~~characterized in that wherein~~ T_2 is between 40 and 75°C, ~~preferably between 50 and 70°C.~~

20. (Currently Amended) The polymerization process as claimed in claim 17,
~~characterized in that wherein~~ T_1 is equal to 80°C and T_2 is equal to 60°C.

21. (Currently Amended) The polymerization process as claimed in claim 18,
~~characterized in that wherein~~ the monomers are monomers derived from acrylamide, in
particular ~~N~~-acryloylmorpholine.

22. (Currently Amended) The polymerization process as claimed in claim 17,
~~characterized in that wherein~~ the chain transfer agent is tert-butyl dithiobenzoate.

23. (Currently Amended) The polymerization process as claimed in claim 17,
~~characterized in that wherein~~ the initiating agent is azobisisobutyronitrile.

24. (Currently Amended) The polymerization process as claimed in claim 16,
~~characterized in that wherein~~ the control of the flux of initiator radicals is achieved by the use
of an initiating agent having a decomposition rate constant which is greater than that of
azobisisobutyronitrile at the uniform temperature under consideration.

25. (Currently Amended) The polymerization process as claimed in claim 24,
~~characterized in that wherein~~ the initiating agent is 2,2'-azobis(2,4-dimethylvaleronitrile).

26. (Currently Amended) The polymerization process as claimed in claim 24,
~~characterized in that wherein~~ the polymerization is carried out at uniform temperature.

27. (Currently Amended) The polymerization process as claimed in claim 24,
~~characterized in that wherein~~ the monomers are monomers derived from acrylamide;
preferably ~~N~~-acryloylmorpholine.

28. (Currently Amended) The polymerization process as claimed in claim 24,
~~characterized in that wherein~~ the chain transfer agent is tert-butyl dithiobenzoate.

29. (Currently Amended) A polymer of acrylamide or of its derivatives having a
number-average molar weight of greater than or equal to 100 000 g/mol, ~~characterized in that~~
~~wherein~~ it has a polydispersity index of less than 1.2 when the molar weight is absolutely less

than 200 000 g/mol and in that it has a polydispersity index of less than 1.4 when the molar weight is greater than 200 000 g/mol.

30. (Currently Amended) The polymer as claimed in claim 29, ~~characterized in~~
~~that wherein~~ it is an N-acryloylmorpholine homopolymer.